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The Morse-Libby Mansion

A Report on Restoration Work

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The Morse-Libby Mansion

Portland, Maine

A Report on Restoration Work
1973-1977

By Morgan W. Phillips
Society for the Preservation of New England Antiquities

Technical Preservation Services Division
Office of Archeology and Historic Preservation
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Foreword

The National Park Service Historic Preservation Grants-in-Aid program is a cooperative partnership between the 50 States of the Union, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Trust Territory of the Pacific Islands and the National Trust for Historic Preservation for the acquisition, protection, rehabilitation, restoration and reconstruction of historic properties listed in the National Register of Historic Places.

The National Historic Preservation Act of 1966 provides for matching grants of up to 50-percent for the preparation of comprehensive statewide surveys and for the acquisition and development of registered properties. States and Territories may transfer funds to local governments, private organizations and individuals. When funds are transferred to private organizations and individuals, the public interest must be protected for a prescribed period of time by deed covenants which guarantee continued maintenance; limited public access; and, should sale of the property occur, first right of refusal on behalf of the State. The administration of the grants-in-aid program within each State, including selection of projects for funding and supervision of project work, is the responsibility of a State Historic Preservation Officer who is designated by the Governor.

The Technical Preservation Services Division, Office of Archeology and Historic Preservation, has the review responsibility for all grant-assisted acquisition and development projects funded under the National Park Service Historic Preservation Grants-in-Aid program. The Division assures that each project submitted by the States meets standards established by the Secretary of the Interior.

In accordance with the 1966 Act, Title I, Section 102 (1) and (4), the National Park Service requires the submission of an Acquisition or Development Project Completion Report ninety days after final expenditure of grant funds. Project completion reports present a full account of work performed with Federal funds. Acquisition Project Completion Reports describe the type of acquisition and any unusual procedures and circumstances relative to the project. Development Project Completion Reports describe project work in detail, citing and evaluating significant historical, architectural and archeological findings or accomplishments. To illustrate specific points in the text, photographs, sketches and copies of the architect's final working drawings are included. The historical and technical information extracted from completion reports is of considerable value and will be disseminated to historic property owners and those people involved in the preservation and maintenance of historic resources throughout the country.

Technical Preservation Services Division staff members, Kay D. Weeks, Technical Writer-Editor, and Charles E. Fisher III, Architectural Historian, made substantial contributions toward development of the manuscript into its published form. John R. Volz, Historical Architect, has redrawn the author's original free-hand sketches.

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Preface

The Morse-Libby Mansion, located in Portland, Maine, is one of the finest Italianate villa-styled brick and brownstone townhouses in the United States (Figs. 1, 2). Henry Austin, an architect from New Haven, Connecticut, prepared the plans for the house.

The exterior of the building exhibits a marked similarity to a portion of Osborn House on the Isle of Wight, one of the favorite residences of Queen Victoria, in whose honor the house was originally named (Victoria Mansion). The interior includes elaborate ceilings and wall decorations designed by Giovanni Guidirini, an artist-decorator from New York City who employed 11 Italian artists to execute his plans (Figs. 3, 4).

Figure 1 Southeast and southwest facades, c.1870. *Courtesy of Earl B. Shettleworth, Jr.*

Figure 2 Southeast facade, 1973. *Photograph by Richard W. Cheek*

Figure 3
Main Stairs, 1936.
Historic American Buildings Survey collection

Figure 4
Dining room, 1936.
Historic American Buildings Survey collection

Built for Ruggles Sylvester Morse, a New Orleans hotel owner, construction of the Morse-Libby Mansion began in 1859, but due to delays caused by the Civil War, was not completed until 1863. In 1895, Portland merchant J.R. Libby acquired the house which ultimately became the property of the Victoria Society of Maine Women in 1943.

On May 19, 1970, the Secretary of the Interior placed the property on the National Register of Historic Places and on December 30, 1970, the Morse-Libby Mansion was declared a National Historic Landmark.

In the fall of 1972, the Victoria Society of Maine Women contracted for an architectural survey through the Maine Historic Preservation Commission in an effort to identify repair work necessary for the continued preservation of the Morse-Libby Mansion. The survey report, prepared by Mr. Morgan W. Phillips, an architectural conservator for the Society for the Preservation of New England Antiquities (SPNEA), consisted of an analysis of the structure and his recommendations for restoration based on identification of the following major problems:

a) Leaking roof and non-functioning gutters
b) Deteriorating stonework
c) Decay of the wooden cornices, porches, and other wooden trim on the mansion and carriage house
d) Loss of adhesion of the "mastic" or simulated stonework used on several exterior walls of the mansion and carriage house
e) Some general deterioration of the interior decorative painting

Repairs to the cornice, gutter and downspouts were considered to be of an urgent nature. Through the cooperation of Maine's State Historic Preservation Officer, Mr. James H. Mundy, a National Park Service historic preservation grant-in-aid was awarded in 1972, matched with funds from the Victoria Society of Maine Women, for cornice, gutter and downspouts repairs in addition to the architectural survey. A second grant in 1974, also administered by Mr. Mundy, provided for completion of the gutter and cornice restoration and the initiation of repairs to the small rear entrance porch and cellar bulkhead. In 1975, the State Historic Preservation Officer, Mr. Earl B. Shettleworth, Jr., assigned a third National Park Service grant-in-aid to complete the small rear entrance porch restoration and improve the dry wells and underground drains. In 1977, a fourth grant-in-aid was awarded by Mr. Shettleworth for reconstruction of the ell porch.

The report which follows, in three parts, has been extracted from the Development Project Completion Reports prepared by Mr. Morgan Phillips for the Maine Historic Preservation Commission as a result of the above-mentioned grants-in-aid. Most of the photographs which illustrate the text were taken by the author. Exceptions are noted by courtesy lines in the captions.

Kay D. Weeks
Charles E. Fisher
Technical Preservation Services Division

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Figure 5 Cornice elements prior to restoration.

Figure 6
Water damage to rear masonry walls.
Photograph by Richard W. Cheek

Part I

Cornice, Gutter and Downspouts

The wooden cornice elements of the Morse-Libby Mansion are significant architectural features of the building's exterior. Without periodic painting of the cornice and repairs to the leaking roof gutter, serious decay of the original cornice elements had occurred and water damage to the masonry walls was, in consequence, accelerated (Figs. 5, 6). The Victoria Society of Maine Women, therefore, implemented plans for the restoration of the cornice, including the gutter, fascia, soffit, wooden modillions and decorative mouldings. In order to preserve the maximum amount of original woodwork, new cornice sections were installed only where the old wood had rotted beyond repair or was completely missing.

Planning for Cornice Repairs

Examination and Numbering

A detailed examination of the cornice was made in order to determine the extent of deterioration.

Before dismantling any portion of the cornice, the modillion blocks were numbered consecutively from 1 through 126 starting at the north corner of the front gable, No. 1 being the first modillion on the north wall of the gabled section (the first modillion having a section of gutter above it rather than raking mould). The entire length of the cornice was thus divided into numerical bays. Painted on additional cornice elements were the numbers of the modillion block directly adjacent or the first modillion block to the left as one faces the cornice. Soffit boards had not only the modillion block numbers but also a subscript such as *a*, *b*, *c*, or *d*, (Figs. 7, 8, 9) to indicate which was farthest from the wall (with subscript *a* being the nearest to the fascia and *c* or *d* being the farthest to the wall depending on whether there were three or four boards).

Decision to Use Redwood

At first it had been planned to make the new cornice elements out of pine. Redwood, however, was finally chosen because of its advantages:

- —availability in much better grades
- —cost the same as pine
- —much greater dimensional stability during moisture changes
- —inherent decay resistance.

The disadvantages of redwood were given careful consideration. First, redwood sometimes splits off at the surface in fairly large splinters even after cutting and installation. It was felt that there would not be very much of this splintering. Second, certain extractives in redwood are said to corrode iron or steel nails; therefore, bronze hardware would have to be used. Third, and most important, it is said that redwood causes paint to stain brown or to peel. This reputation is not consistent with the very high rating for "paintability" given in well-known architectural reference books such as Caleb Hornbostel's *Materials for Architecture*, where redwood is rated far higher than pine in paint-holding ability. A clarification was attempted through telephone discussions with the following agencies and persons:

- —the National Park Service architect who had used painted redwood at Independence Hall (Lee Nelson)
- —Senior historical architect for New York's Division for Historic Preservation who had used

painted redwood at Hyde Hall (Jack Waite)
—the California Redwood Association
—the Forest Products Laboratory of the U.S. Department of Agriculture (Harold Tarkow)
—M.I.T. Building Engineering Department (Albert Dietz)
—the National Paint, Varnish, and Lacquer Association
—the National Lead (Dutch Boy Paint) Company (Francis Loutrel)

According to some of the sources contacted, redwood apparently contains two types of "extractives" (oils or saps) which can adversely affect paint. The oil-soluble extractives can bleed through an oil paint film, staining the surface brown. The water-soluble ones can accumulate under an oil paint film, causing it to peel. Correct painting procedure and the right type of paint can counter these two problems effectively, in which case the redwood exhibits

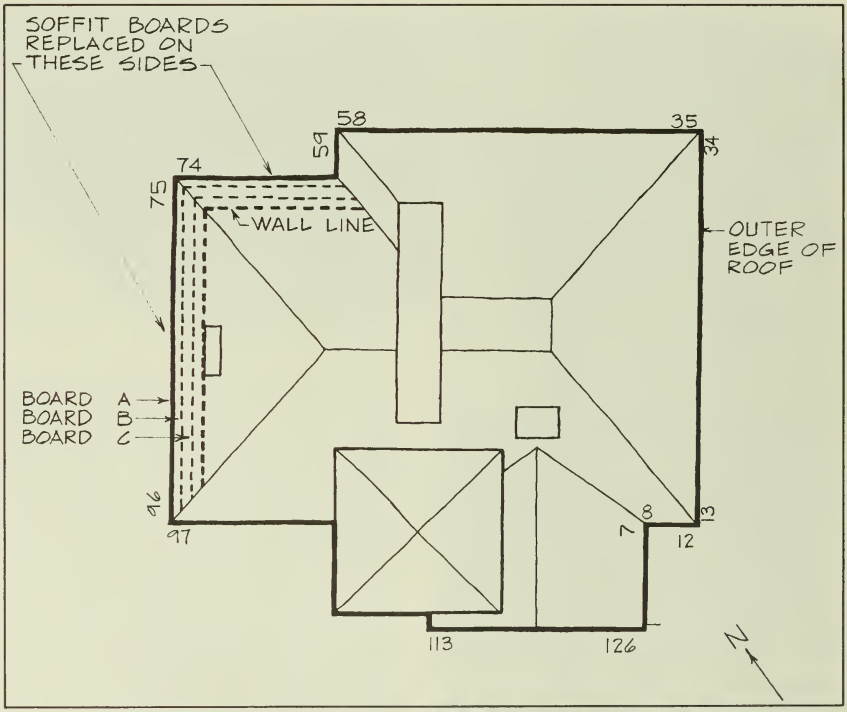

Figure 7 Roof plan, numbering of modillions.

Figure 8 Numbering of modillion blocks.

excellent paint-holding properties because of its dimensional stability during moisture changes.

The oil-soluble extractives can be counteracted by using an alkaline pigment which reacts with them. Since most of the extractives are acidic substances, basic lead carbonate pigment (white lead) "ties them up," reacting to form certain compounds. White lead was the basis of the new paint used at the Morse-Libby Mansion. Even if the white lead fails to "tie up" the oil-soluble extractives completely, they are not likely to bleed past the two applications of sand in the new Morse-Libby paint. If bleeding occurs, it would almost certainly not be noticed against the heavy brown tint of the upper layers of paint.

Figure 9 Numbering of wooden cornice elements using modillion blocks as reference points.

The water-soluble extractives were of greater concern because they might lead to peeling. But according to Dr. Tarkow, Mr. Loutrel and representatives of the Redwood Association, the water-soluble extractives of redwood do not normally cause a problem with a white lead/linseed oil applied directly after milling. The oil penetrates the surface well, thus establishing a strong hold. Only if the wood becomes wet or repeatedly damp before painting could water-soluble extractives become concentrated in the surface pores and thus interfere with paint penetration and adhesion.

Repair and Replacement of Cornice Elements

Crown Mould

The original crown mould was found to be in worse condition than anticipated (Fig. 10). Accordingly, a new crown mould was made from clear heart redwood glued in sections with resorcinol formaldehyde waterproof glue, then splined. The cutting of all mouldings was accurately done by the Windham Millwork Company of North Windham, Maine, based on full scale drawings, models and templates supplied by the SPNEA (Fig. 11). Mechanical contour reproduction was considered appropriate because the original was very regular and probably machine-made. A new crown mould was installed from modillion 1 to modillion 29; from 44 to 58; and from 97 to 110.

A portion of the original crown mould was saved and reused between points 29 and 44. This portion had to be impregnated with a penetrating epoxy wood consolidant by drilling holes across the wood grain and soaking the epoxy into them. Mr. Paul Stumes of the Canadian Department of Indian and Northern Affairs has done much of this work and advised that a special wood preservative be applied before the epoxy. He said that water repellent types of

preservatives would prevent the penetration of epoxy and thus suggested the following solution:

.5% (by weight) cobalt naphthenate
7% (by weight) orthophenylphenol
92.5% (by weight) alcohol

The cobalt naphthenate was used to speed the set of the epoxy although it is not clear that it had this effect.

tions, were stored in the barn. Much of the crown mould was rotted to pulp and had to be discarded.

From approximately point 50 to point 74, the crown mould found in place was not the original but a pine replacement of approximately ten years ago. Although the profile was not precise, the section was left in place between points 59 and 74 to make up for a shortage of the new redwood crown mould.

Figure 10 Advanced deterioration of crown mould.

After treatment, the sections of original crown mould were reinstalled in their original locations, although moved a few inches toward the corner of the roof to replace several inches of rotted material which had to be removed (Fig. 12).

These sections, between points 29 and 44, were the only portion of the original crown mould which had neither warped nor eroded badly at the surface, thus retaining its original cyma recta profile. The profile was then duplicated in the newly constructed sections (Fig.13).

One short piece of original crown moulding, from approximately point 44, was deposited with the Maine State Historic Preservation Commission. Other badly rotted sections, numbered to correspond to modillion block loca-

The original crown mould had been spiked to a backing piece which in turn had been spiked into the ends of the cornice outriggers (Fig. 14).

The spikes holding the original crown mould to the backing piece had been driven through the backing piece and into the crown mould from behind. The soffit and roof boards had apparently not yet been installed, thus giving the builders access to accomplish this work. The soffit and roof boarding were never completely disassembled during the current restoration; therefore, the new crown mould (and the original sections) had to be lag bolted into the backing piece (Fig. 15).

The bolt heads were countersunk and the holes waterproofed with a soaking of Hydrozo's *Clear Water-Repellent Coating* followed by two

coats of Hydrozo's white *Exterior Wood Coating* (both manufactured by Hydrozo Products Co., P.O. Box #1381, Myrtle Beach, South Carolina 29577). Bronze bolts were used so as to resist the corrosive action of extractives in the redwood.

Figure 11 Reproduction of crown mould checked with template.

Figure 12 19th century geometric construction for cornice profile.

Figure 11 **Figure 12**

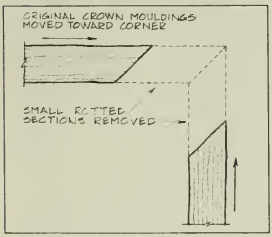

Figure 13 Plan for repairs to crown mould.

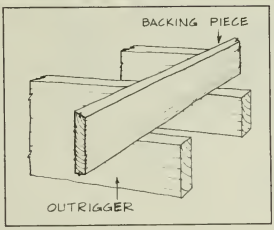

Figure 14 Location of original backing piece for cornice.

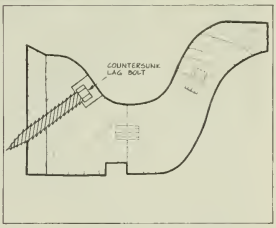

Figure 15 Bolting detail for new crown mould.

Bed Mould

The original bed mould, salvaged between points 15-23 and 30-35, was reused in very nearly the original locations. The new bed mould was made of redwood and installed from points 1-15, 23-30, 35-74 and 97-110, using bronze nails. Machine-cutting of the bed mould was considered appropriate because of the regularity of the original.

Fascia Boards

The original fascia was salvaged and reused between points 21-34 in approximately original locations. New fascia boards were cut from pine and installed with bronze nails between points 1-21, 35-74 and 97-110 (Fig. 16). Although some date markings were painted on the backs of the new boards, the most reliable and easiest way for a future investigator to tell the new from the old would be through the examination of the back side. New boards are planed on the backs while the old are rough-sawn. The exposed surface of the new boards were not hand-planed since the original boards did not display obvious hand-planing marks.

Unlike the original, the new fascia boards were cut to protrude downward about 1/16" below the soffit boards to form a drip edge. The change is not visible from the ground.

Soffit Boards

New soffit boards were installed in the following locations:

6-11, *a, b, c, d*	50*a*	97-110 *a, b*
12*a*-13*a*	57*a*-58*a*	
34*a*	59-63 *a, b, c,*	
36*a*	64*a*-65*a, b*	
46*a*	74*a*	

The new soffit boards replaced severely rotted sections of the originals (Figs. 17, 18). We were careful to note that the original soffit boards were of random width and, in some cases, tapered. The widest original soffit boards were always at the outer edge (*a* location) while those nearer the masonry wall were progressively narrower. Each new soffit board precisely followed the edge contour of the rotted section of board it replaced, so that the building's ap-

Figure 16 New pine fascia boards installed between modillions 97-110.

pearance was not affected. Tongue and groove joints were cut on a router to form the edge joints of the boards. Where a new section of board abutted the end of an old section, the end joints were all hidden behind modillion blocks. Bronze nails were used throughout.

Although some date markings were painted onto the backs of the new soffit boards, the easiest way for a future investigator to tell the new from the old is that the old boards are rough-sawn on the back while the new are machine-planed. Machine-planing was considered appropriate for the exposed surface of the new boards; the old boards had not displayed obvious hand-planing marks.

Many of the old soffit boards, although still usable, were warped (buckled downward) and many of the old nails securing them to the bottoms of the outriggers were rusted out. All the old boards were securely fastened with

Figure 17 Soffit boards removed prior to restoration.

Figure 18 New soffit boards installed and painted.

bronze screws or nails into the bottoms of the outriggers. Some boards were jacked up before reattachment. The outer ends of the outriggers were partially deteriorated at the locations of the original nailing for soffit and fascia boards; therefore, new pieces of 2' x 4' pine were nailed to connect all the ends of the outriggers and provide a more secure nailing for soffit and fascia boards (Figs. 19, 20). A few other minor reinforcing pieces were installed to supplement the attachment of the soffit boards.

Several small round ventilators were installed in the soffit boards to circulate air into the cornice interior and under the gutter lining. These vents were placed directly over attic windows where they can be plugged by reaching out of the window if they cause too much heat loss or other problems. A tin-coated iron rectangular vent was found in the soffit board. This appeared to be original, having the early sanded paint. It consisted merely of a sheet of tin plate punched with holes. Because the vent was badly rusted, it was removed (along with most of its cut nails), stored in the barn and replaced with a similar one made of aluminum and coated with sanded paint.

Modillion Blocks

Modillions numbered 44 through 100 had to be replaced with redwood duplicates, glued in

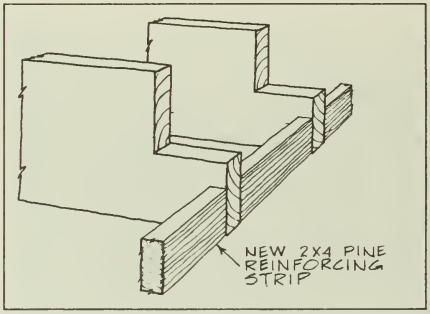

Figure 19 New 2' x 4' pine reinforcing strip.

Figure 20 New 2' x 4' pine reinforcing strip.

Figure 21 Sound modillion blocks in place.

sections by Windham Millworks. All the other old modillions were in good condition, although the nails holding them to the soffit boards were badly rusted (Fig. 21). All the modillions were secured tightly to the soffit boards with bronze screws driven in from the upper sides of the soffit boards. Many modillions required some jacking up.

Modillion Mouldings

New sections of redwood moulding were applied to the modillions to replace approximately 15% of the total on each side repaired. Bronze nails were used to secure the redwood.

Treatment of Cornice Elements

Preservative and Primer

New and old soffit and fascia boards and bracket and rafter ends were treated on all bare wood surfaces, including backs, edges and ends with a "flowing" coat of U.S. Plywood's *Woodlife* (4% pentachlorophenol solution with added water-repellents). On the north side of the house, linseed oil was added to the *Woodlife* and applied to the old wood as a way of reducing its porosity. This was later considered unnecessary and was not repeated on the other sides of the house.

After treatment and following at least 48 hours drying time, the soffit and fascia boards and rafter and bracket ends were primed on the backs, edges and ends with Dutch Boy's paint (made specifically for barns and fences), consisting of a pure linseed oil medium, iron oxide red pigment and calcium carbonate. Back-priming reduces dimensional changes in the wood by retarding moisture passage in and out of the back of the wood, and also mitigates the effects of any water which might leak onto the back of the boards from a defect in the roof. Both of these advantages should preserve the wood and help the paint adhere to the visible surfaces.

All bare wood on the exposed faces of new and old fascia and soffit boards was painted with a thin penetrating primer of white lead, raw linseed oil and turpentine. This was tinted with burnt umber, and, in some cases, burnt sienna and synthetic yellow iron oxide. It may have been better not to use the burnt umber in the primer because this pigment speeds drying and may reduce penetration. However, the primer did dry flat which suggests that it penetrated well.

The new redwood elements, containing natural preservatives, were not treated with wood preservatives because it was thought that this might have interfered with the adhesion of the paint. The redwood elements were primed and back-primed with the white lead primer described above.

The gutter trough (both new redwood or existing pine) was not painted with lead and oil but treated first with two flowing, penetrating coats of Hydrozo's *Clear Water-Repellent Coating* and then coated with two applications of Hydrozo's white *Exterior Wood Coating*. The gutter trough represented an area likely to be wetted by condensation dripping off the underside of the metal gutter liner. Since the primer of Hyrdozo's *Clear Water-Repellent Coating* penetrates deeply, it cannot peel off under moist conditions and hopefully will provide lasting protection. The adhesion of the Hydrozo's white *Exterior Wood Coating* is not as certain to be successful, but is not of critical importance.

Sanded Paint

Following the example of the original specifications, the wooden elements were made to resemble Portland stone by applying two coats of paint (Fig. 22) and then dusting each with sand while still wet. All bare wood had been primed with the white lead primer described above. Each of the two coats consisted of Dutch Boy's white lead, Benjamin Moore's burnt umber in oil, Moore's synthetic French ochre in oil and Moore's burnt sienna in oil. The coat was thinned with turpentine and contained a low enough proportion of linseed oil so as to dry mat and offer a good bond to the final coat. The finish coat contained no turpentine and a much higher proportion of boiled linseed oil. Universal colors (ground in ethylene glycol) were avoided because of their detrimental effect on paint film when used in quantities sufficient to make a deep brown from a pure white lead base. The

color pigments were chosen for their absolute resistance to fading. Adequate supplies of the white and color pigments in oil were purchased for painting all remaining woodwork. Oil colors and white lead are becoming hard to find; therefore, a good deal of time was spent procuring reserves.

The paint was mixed according to the following proportions:

400 lbs. white lead in oil (soft paste: 88% basic lead carbonate by weight)
7-1/4 qts. burnt umber
3-7/8 qts. burnt sienna
5-3/4 qts. yellow ochre

Sand samples from the original paint were extracted and later identified by John Rand (former State Geologist) as coming from a local beach. The purple garnet color, transparency and fine texture were of some importance in the creation of a paint made to resemble purple stone. Similar sand of very high purple garnet content was obtained from Jordan's Beach, courtesy of Mr. Phineas Sprague, and was washed free of salt. This color was lightened to approximate the old sand by additions of a whitish sand from Milford, Massachusetts (Vitalini fine sand). Although enough purple sand was obtained to complete the cornice work, future beachcombing could be avoided by buying pure crushed purple garnet and mixing it with other common sands. Such garnet was found to be available from the Idaho Garnet Abrasive Co., Box 1080, Kellogg, Idaho 83837.

The color of the original exterior paint had been formulated to match the purple color of the unweathered stone. A similar approach was used in the restoration. In matching the stone's present weathered color, the sanded paint was made considerably less purple and more orange-brown than the original.[1]

Repair and Replacement of Downspouts and Gutter

Downspouts

Although it had been recognized before the repairs began that the original downspouts were concealed in the masonry, we discovered upon opening the cornice that there had apparently been only one point of drainage from the gutter in the entire front part of the house, namely at the northwest corner. The brickwork contained holes (one on the west wall and one on the north wall—both near the corner) through which the elbow leader from the gutter passed into an attic tank. From there, a drain passed down through the western wall.

Figure 22 Detail of painted cornice.

The original downspout elbows had been concealed above the soffit boards in order to make the entire cornice visually free from drainage equipment. The roofer and carpenter expressed legitimate disapproval of this method because the low pitch of the elbows might have increased the accumulation of winter ice or caused partial clogging with gravel from the present asphalt shingles (the original roof had been all metal). Also, leakage of the elbow would have damaged the cornice woodwork.

Accordingly, the elbows were installed below the cornice (Fig. 23) using corrugated round piping to obtain the rigidity necessary for spanning the open space.[2] Copper was used to assure electrochemical compatibility with the copper gutter liners.

As soon as possible, small dry wells should be dug to collect the water emitted from the downspouts. The dry wells should be at a safe distance from the house. At present, water is still being deposited at the foot of the walls, although a section of large plastic pipe will be installed above grade to carry the water a few feet away.

Figure 23 Section of new downspout.

Gutter and Gutter Liners

The channel for the original wooden gutter trough was hand-hewn (almost certainly in place) to an increasing depth from the front of the building toward the back. The carpenter discovered no pitch at all to the old crown moulding as a whole.

The new wooden gutter trough, although milled to a constant size, could easily have been made to pitch internally like the old by fitting into it treated boards gradually tapering in width. The copper liner could have been formed to this varying width, although at a greater cost. In view of the need for positive drainage to protect the stone below, it seemed unadvisable to force water from the front of the house all the way back to the northwest corner. This corner would probably be the last place where snow would melt off in the spring; thus, water from spring rains might run into a blockage. It was decided that well distributed drains were needed which would allow the gutter liner to be divided into several sections with expansion joints. The fact that the original gutter was progressively more deteriorated in relation to the distance away from the one point of drainage did suggest that the old system was troublesome (Fig. 24).

The roof was originally designed so that the outer edge of the gutter was higher than its inner edge. This required that any gutter liner extend continuously up the roof boards as an apron for a distance sufficient to raise the inner edge of the apron above the outer edge of the gutter allowing excess water to drain over the outer edge (Fig. 25).

Originally, the metal had been continuous (in soldered sheets) from the gutter to the top of the roof. Because the entire building will not be re-roofed at this time, the apron was only carried up as far as a 30" wide sheet of copper would allow. Unfortunately, 36" copper, which would have been preferable, was not readily available in 20 oz. weight, a problem which was

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[1]Crushed orange garnet from Barton Mines, North Creek, New York, was added to the purple garnet sand, creating a less purple appearance than the original sand. The mixture was then applied to the wet paint, using a compressed air-operated glitter gun made by Binks and distributed by Goldblatt (Stock #13-311-H5). The new sanded paint is clearly distinguishable from the old upon close inspection because of the bright color and sharp, glassy fracture of the crushed particles.

[2]It would be interesting to have used one concealed elbow. Only the downspout itself would be exposed (handmade downspouts of rectangular sections with three-quarter rounds at the corners would be used with embossed header boxes).

not foreseen until it was too late. The present apron is wide enough to force water to flow over the front edge of the gutter, but another wide strip of copper may have to be added to its upper edge to prevent ice backup. This may not be a problem until the house is heated. If ice backup does occur, it is not likely that another 6" on the present new liner would have prevented it.

New gutter liner material

A good deal of consultation was undertaken to determine the best liner material. Lead-coated copper is usually considered superior by most American roofers, but there was concern about cost and other possible problems. First, paper mills in the Portland area could emit sulfur oxides which would cause premature cor-

Figure 24
Original gutter prior to restoration.

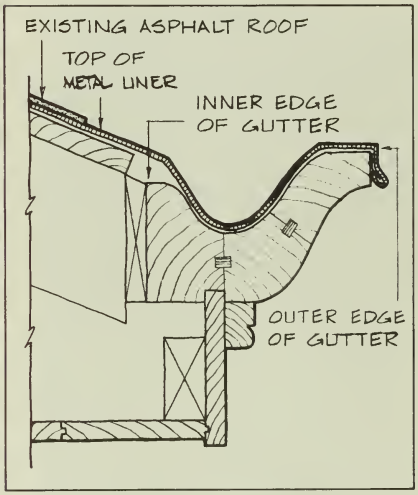


Figure 25 Requirement for metal liner.

rosion of the copper; however, neither John Stevens (a Portland architect of long experience), nor any of the local roofers consulted, knew of premature copper failure in Portland. Another possible problem is that at such future time as the mansion is roofed entirely with metal, copper would have to be used for the entire roof to assure electrochemical compatibility with the new liner. In view of the skyrocketing price of copper and the development of soft stainless steels, a future conservator might prefer to use stainless steel but would then have the problem of the copper liners.

Mr. John Waite (senior architect, New York State Division for Historic Preservation) was consulted because of his expertise in metal roofing. He suggested the Follansbee Steel Corporation of Follansbee, West Virginia, which sells a very soft, workable stainless steel that, unlike bare stainless steel, is easily soldered because it is coated with terne-metal (lead plus tin). Mr. Waite strongly urged that stainless steel not be used until a reliable performance record has been developed, pointing out its slight susceptibility to rusting. The steel is produced in much thinner sections than the copper to insure workability.

Mrs. Penelope Batcheler (historical architect, Independence National Historical Park, Philadelphia, Pennsylvania) has used the Follansbee steel for some gutter work at Independence Hall, where cedar shingles above lead-coated copper apparently caused the copper to erode and corrode prematurely both by channeling water to copper just below each joint of the shingling and by releasing acids into the water. The polluted air of Philadelphia probably contributed to the problem. Mrs. Batcheler was fully aware of the experimental nature of the use of steel.

Mr. William Heidrich (a senior engineer of the Revere Copper Company) was able to make a more convincing case for copper than his counterpart at Follansbee could make for stainless steel. He said that fast drainage of all water is a requirement for stainless steel roofing because droplets of water (including those of condensation on the underside) have an electrochemically corrosive effect on the stainless steel. This is very possible true, although it is not mentioned in the *Architectural Sheet Metal Manual* of the Sheet Metal and Air Conditioning Contractors National Association. Mr. Heidrich said that a future steel roof would be compatible with the present copper liners if an insulating layer (such as a thick coat of paint) separated the two materials.

The most convincing arguments of all in favor of the copper are that it costs less than the steel and is a proven material.

Mr. Waite had suggested another possible alternative as a money-saving device if the present gutter liner is to be considered only temporary. He has successfully used neoprene rubber for temporary gutter liners on one building. He suggested Mr. Stanley Warshaw of Technical Coatings, Inc., at Needham, Massachusetts, be consulted. Mr. Warshaw said that neoprene will probably last longer than any metal roofing because it is not readily corroded by polluted air; he cited examples of neoprene roofs up to 15 years old, such as the Yale University hockey rink. He highly recommended the Portland firm of Hascall and Hall as installers of neoprene.

The choice not to use neoprene involved three considerations. First, it would have had to be glued tightly to the wood of the gutter trough, which might well have caused rotting of the wood directly beneath the neoprene if moisture penetrated in any way. Secondly, the neoprene would have had to be built up to a thick section to span the gap between the roof boards and the gutter, thus detracting from the economy of using neoprene. This gap could not be left open because the front edge of the gutter is higher than the back edge. Third, the eventual decomposition of the neoprene could have become a problem for someone installing a metal roof in the future because the products of decomposition might be corrosive, therefore requiring removal from the gutter.

The use of metal allowed the liner to be inserted in such a way that air could circulate between the liner and the wood of the gutter, thus preventing accumulation of any condensed moisture on the under side of the metal liner. Not only was the metal imperfectly fitted to the wood to insure air circulation, the gap between the roof boards and the gutter was utilized and

occasionally even widened to connect the air circulation space under the metal liner with the void (space) within the boxed-in cornice (fig. 26). The space within the cornice was in turn vented to the outside air with inconspicuous metal louvres in the soffit boards.

New gutter liner design

The two existing galvanized iron gutter liners (one over the other) were removed, and sections labled and stored in the barn. It was found that neither was original.

The earlier (lower) gutter was an integral part of the existing metal roof which underlies the present asphalt roof. The upper was a later replacement soldered onto the lower one. When these two liners were removed, evidence for the original roof edge was found: one tin-coated iron roofing clip remained on the west slope of the roof near the gutter and a continuous row of closely spaced small nail holes existed on the top surface of the outer edge of the gutter, indicating that the metal had been nailed here. Since the original specifications call for painting the roof, perhaps the nail holes in the original metal had, at first, been adequately sealed with paint or perhaps each hole was soldered tight. This type of nailing is not considered good practice today not only because of possible leakage, but because the metal is restrained from temperature expansion and contraction, thus introducing stresses. A good practice is to nail clips or strips of metal to the supporting substrate. The clips are designed to be incorporated into the folded edges of the metal sheets, allowing the sheets to slide. This way, all nails are covered by sheet metal and thermal stresses are relieved.

A gutter liner of sufficient length must have expansion joints every so often to prevent cumulative thermal expansion from buckling the metal. It was clear that the original gutter liner had been continuous, not divided into sections by expansion joints. Although causing certain thermal expansion stresses, the original continuous nailing may have helped to prevent the gutter liner from buckling dramatically upward. Because the concealed clip method was to be used along the edge, a determination had to be made regarding expansion joints. The resistance of a gutter to buckling depends on its "columnar strength" which varies with the thickness of the metals and the depth and shape of the trough. Since Revere's metal roofing guidebook, *Copper and Common Sense*, did not give required expansion joint intervals for round-section gutter liners, a full profile of the gutter and a sketch plan of the roof were sent to Mr. Heidrich, who had been one of the formulators of the expansion joint tables. He felt that the

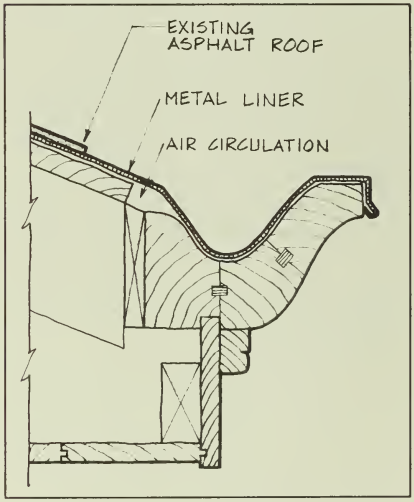


Figure 26 Air space between metal liner and wooden gutter.

Morse-Libby project might not need the joints, providing 20 oz. copper were used.

It was decided, however, to use three expansion joints even though it required approximately a day's labor for each one (Fig. 27). The use of three joints resulted in the need for one extra downspout, rather unattractively located on the west wall and passing in front of an attic window.

The original gutter liner had obviously not been turned down at all over the outer edge of the gutter. The uppermost vertical surface of the wooden crown mould still had the original sanded paint all the way up to the corner. The lack of any differential weathering of this paint rules out the possibility that the paint had been applied first and the metal crimped over it afterwards. Without a turndown edge, water would seep in between the metal and the wood. Accordingly, the edge of the new liner was turned down 1″ over the corner and an additional ½″ wide, 45° kick-out, was bent into the edge of the metal to keep icicles from forming on the painted wood and to reduce the amount of water dripping down over the wood surfaces. This edge was secured to a continuous clip as shown below (Fig. 28).

In order to re-create the original appearance, sanded paint was applied to the entire edge which had been turned down over the top of the gutter. To promote its adhesion, the lead-coated copper was wire brushed, cleaned with mixed solvents (lacquer thinner) and primed with Travaco's *Surf-Tex*, an epoxy paint.

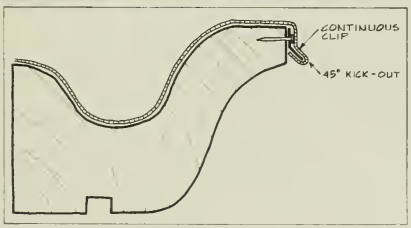


Figure 27 (above) Restored gutter with expansion joint.

Figure 28 (below) Detail of 45 degree kick-out.

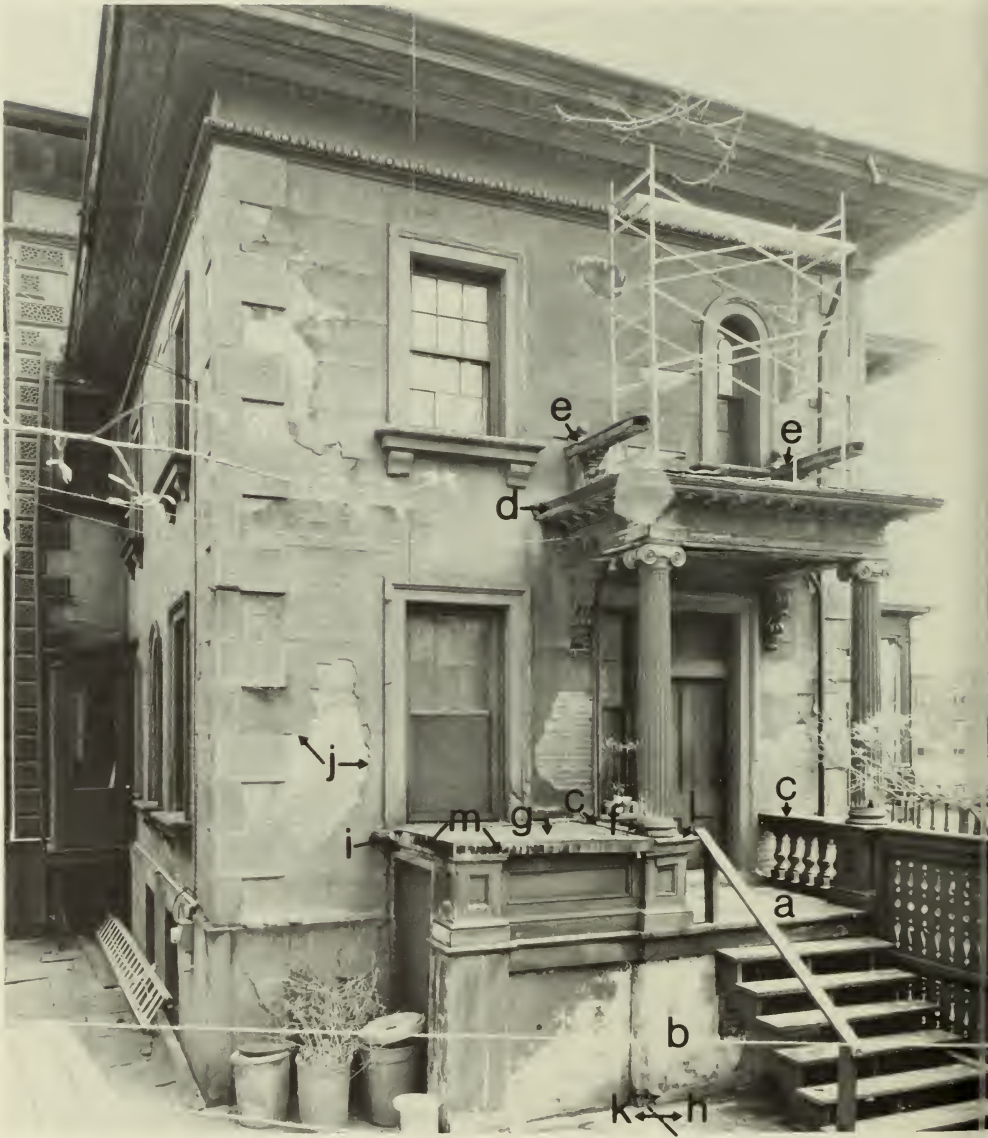


Figure 29 Porch prior to restoration.

Photograph by Richard W. Cheek

Part II

Small Rear Entrance Porch and Cellar Bulkhead

Part II is divided into three sections: the first section describes the condition of the small rear entrance porch and cellar bulkhead prior to restoration (Fig. 29); the second section supplies architectural evidence defining the porch's development throughout the years; and the third section describes the actual repair and restoration procedures.

Condition of Porch and Bulkhead

Porch

The porch is situated behind the kitchen ell and offers the sole access to the ell from outside the house. For this report we will assume the porch to be facing west with a bulkhead enclosure along its north side.

The porch floor (Fig. 29:a) is of wood frame construction supported by a brick wall surrounding the cellar stairwell (Fig. 29:b). This floor also functions as a roof over the cellar stairwell.

Along the north and south sides of the porch are rails (fig. 29:c) with pedestals at the front. Resting on the front pedestals are Ionic columns which in turn support the roof above the porch. The hip roof of the porch (Fig. 29:d) is metal-covered and supports a balustrade around its three sides.

The balustrade around the top of the porch had deteriorated greatly, having lost the entire front (west) section. All that remained of the balustrade were the two pedestals attached to the house; the top and the bottom rails along the north and south sides; eight balusters; and a badly decayed portion of the southwest pedestal.

The condition of the roof complicated the task of restoration because it had completely deteriorated beneath the balustrade. The metal roofing had rusted through and the sheathing boards had decomposed. Water had seeped down the timbers which support the roof, and, as a result, both corners were severely rotted and the timber across the front was similarly decayed along much of its length. In addition, the inside of the finish boarding was rotted at the corners; however, the outer surface was intact in many places.

The plancier around the porch roof was badly rotted, mostly at the corners and along the west or front; the soffit under the entablature was in the same condition and hung down in several places.

The fronts of the Ionic capitals were damaged and much of the carved detail had eroded. The tops of both capitals were badly deteriorated at the centers due to water seeping from above.

The fluted columns were both damaged where they met the bases and there were holes in various places along their length. The base and pedestal under the south column were of recent construction, presumably replacing one which had rotted away. Some of the original moulding had been used in this later rebuilding of the pedestal.

The base and pedestal under the north column were original, but in poor condition, the base having recently suffered the effects of improperly installed metal flashing over the adjoining bulkhead roof (Fig. 29:f).

The porch floor, made up of 1½" thick tongue and groove boards, was particularly rotted along the north edge. The timbers below were also badly damaged.

Bulkhead

The tar and gravel roof above the bulkhead had leaked in many places (Fig. 29:g) and damage was evident inside the paneled wall on the west side of the stairwell. Most of the brick wall beneath the porch is 8 inches thick; however, a section 12 inches thick exists beneath the porch front (west) wall from the southwest corner to the jog beneath the north column (Fig. 29:h). Because there were no ties or brick bonds between the three wythes of brick in this section, they had separated, leaving large voids in the center of the wall and bulges along the outer surface.

The brick walls rest on stone foundation walls (Fig. 30) which enclosed the cellar stairwell. The stone foundation walls had leaked badly over the years, creating a continuously moist environment in the adjacent area.

Figure 30 Interior view of bulkhead showing brick and stone foundation walls.

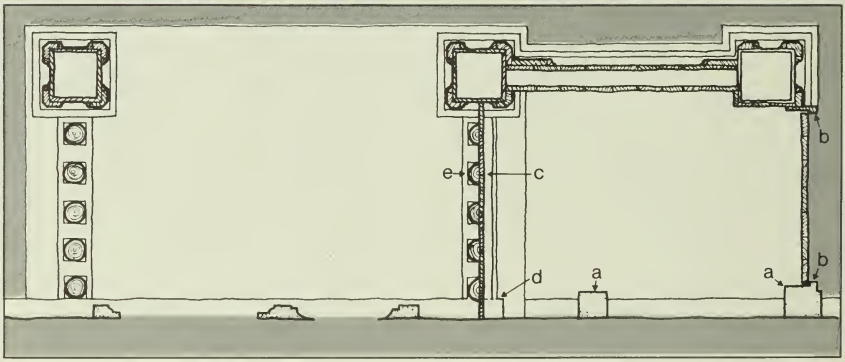


Figure 31 Plan of porch and bulkhead.

The matched board ceiling above the stairwell and beneath the porch floor was damaged due to the leaking porch floor.

In summary, the porch was close to collapse with many elements in an advanced state of deterioration. The restoration plan incorporated the goals of preserving original materials, when salvageable, and reproducing elements which had either been lost or replaced with poorly matching materials. In addition, safeguards were introduced to minimize future deterioration.

Figure 32 Sanded paint on cellar door frame.

Evolution of Porch

In order to keep track of all elements of the porch during the restoration, items of woodwork were numbered and photographed in place (Appendix A). Numbers in this text prefaced by "RP" (rear porch) correspond to the numbers of these items. A list was prepared which included each piece, its historic period, and a description of its disposition during the restoration (Appendix B). Many items considered beyond repair were stored on the second floor of the barn.

Evaluation of architectural evidence clearly established two principal stages (probably separated by a significant number of years) in the construction of the porch and bulkhead.

Bulkhead

The bulkhead postdates the ca. 1860 Ionic porch. Concealed within the bulkhead are architectural features which were originally exposed to view: a cellar window; the lower brackets of the carved stone window sill of a first story window (Figs. 29:i; 31:a); and sanded paint (to imitate stone) on the cellar door frame at the bottom of the bulkhead steps (Fig. 32:a).

Also covered with this same sanded paint is a type of mastic (made of sand and an oil or varnish, typical of the mid-19th century) applied to all the brick of the ell walls (Fig. 29:j). This mastic is peeling off the ell walls and the peeling extends inside the bulkhead area.

The other interior woodwork surfaces of the bulkhead space do not exhibit sanded paint. These elements, added as part of the bulkhead construction, have a thin coat of plain brown paint which appears never to have been intended for exterior exposure. Very recent repairs have no paint at all. Exterior surfaces of the bulkhead have sanded paint with the exception of later repairs which exhibit unsanded brown paint.

Among the surfaces of the bulkhead interior exhibiting unsanded brown paint are the original portions of the doorframe at the top of the cellar stairs (Figs. 33: RP2, RP3, RP7;

31:b); the ceiling beneath the floor of the Ionic porch (fig. 34: RP300); and two boards remaining from the original ceiling of the bulkhead enclosure (fig. 35: RP 317). The matched board west interior wall along the stairs (Fig. 36: RP320) is also painted plain brown with the exception of two recent replacement boards at the south end.

The existing roof rafters and boarding over the bulkhead were added quite recently and are unpainted. Nail marks clearly demonstrate that the original rafters of the bulkhead roof once abutted the top rail of the balustrade alongside the present rafters (Fig. 35: RP118). Since the new rafters are located in almost the same positions as the old, it appears that the old rafters simply rotted away because of an earlier defective roof.

The six vertical boards which fill in the space between the upper and lower rails of the

Figure 33
Unsanded paint on portions of door frame at top of cellar stairs.

balustrade under the north Ionic column exhibit the unsanded brown paint, and thus apparently date with the bulkhead (Figs. 35: RP120; 37: RP120). Sanded paint is found under the ends and edges of these boards on the pedestal and on both rails, indicating that this space had been open prior to the existence of the enclosure. Also, the boards are not embedded into the mastic on the brickwork (Figs. 31:d; 35:b) as is the upper rail of the balustrade; the boards merely abut the mastic.[3]

[3]The upper and lower rails (Figs. 29:c; 37: RP118 and RP126) of the balustrade supporting the north Ionic column of the entrance porch were original to the Ionic porch. The ends of the rail abutting the masonry of the house are neatly embedded in the mastic, indicating the rail is original (Figs. 31:d;35:a). The lower rail abuts the doorway that leads into the ell (Fig. 37). Where these rails and the pedestal project into the interior space of the bulkhead, they exhibit sanded paint which must have been exposed to view before the bulkhead was constructed.

Figure 34
Unsanded paint on ceiling beneath porch floor.

Figure 35
Unsanded paint on portions of bulkhead ceiling.

On the south face of six vertical boards, where exposed to the exterior (Figs. 31:e; 37), five half-balusters cover the joints, providing symmetry with the five full balusters in the balustrade under the south Ionic column. Sanded paint passes under the ends of the half-balusters where they abut the upper and lower rails, again indicating that the half-balusters, like the six vertical boards, are later in date than the upper and lower rails.

One might suspect that before this space was enclosed, there had been full balusters between the upper and lower rails identical to the south balustrade; consequently, five square unpainted areas should exist on both rails where the tops and bottoms of the full balusters prevented the original coat of sanded paint from being applied to the rails. In fact, no such unpainted areas exist, and the undisturbed and continuous character of the earliest coat of

Figure 36
Unsanded paint on west interior wall.

Figure 37
Unsanded paint on vertical board infill of balustrade.

sanded paint on both upper and lower rails seems to indicate that the north balustrade originally lacked balusters and had merely an open space between the upper and lower rails. There is no clear evidence to indicate that full balusters ever appeared on the northern portions of the upper and lower rails now concealed inside the bulkhead enclosure. Had balusters existed, they would have been removed immediately upon the closing of the bulkhead so that marks left by them would not have been disturbed or covered by later applications of exterior sanded paint. It is significant that these marks are not visible. Therefore, one can surmise that the space between the upper and lower rails (Fig. 37: RP118, RP126) remained open until the bulkhead enclosure was built.

Porch Foundation and Floor

The fascia, nosing and bed moulding concealed within the bulkhead along the north end of the porch floor (Fig. 35: RP310, RP311, RP312) contained only the later unsanded brown paint.

The porch floor and some joists below were found to postdate the initial ca. 1860 porch construction (Fig. 38). The front sill was a 20th century replacement. Only the north sill appeared to be original, although it had been doubled-up by the addition of a second timber. All these timbers were replaced as part of the current repair work.

The portions of the brick wall directly beneath the Ionic porch (Fig. 29:h) appeared to be of the ca. 1860 period, thus predating the section below the bulkhead enclosure (Fig. 29:k). The earlier date of the portions below the porch was indicated by the remains of the original sand mastic found along the south wall and along the southern half of the west wall to the jog below the north Ionic column. The portion under the bulkhead enclosure was apparently of later construction since more recent cement stucco remains on the bricks and is integral with the mortar in which the bricks were laid. The interior surfaces of the earlier and later portions of the west wall also exhibit two periods of masonry work, overlapping at the center of the wall.

Figure 38
Post-1860 floor joists.

Directly under the porch stairs, the top six courses of brick, which are very irregular and patchy, appear to be somewhat later than the rest of the wall below (Fig. 39.) It is possible that a stair had previously passed through the upper portion of this wall. Other evidence for an original stair design was a pair of miters for a handrail in the topmost nosing of the south side of the north balustrade pedestal (Fig. 29:l). The set of miters was not reproduced because

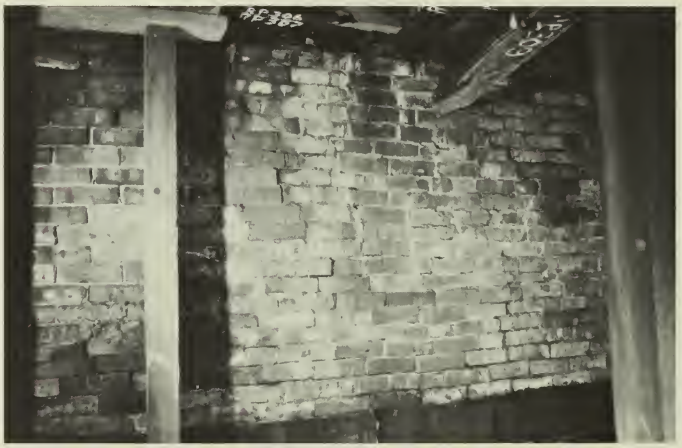


Figure 39
Brick wall beneath porch stair.

plans have yet to be prepared for the restoration of the ca. 1860 staircase; this section of nosing is now stored in the barn.

After removal of the present bulkhead roof, evidence was found to indicate that the nosing which surrounds the north balustrade and pedestal had, at one time, continued around the bulkhead roof (Fig. 29:l). Holes made by cut nails were found in the upper edge of the top board of the bulkhead's northwest corner pedestal. The holes indicate that an earlier piece once ran along these areas (Fig. 29:m). Sanded paint was built up along the top edge of the covered board where the nosing had projected (Fig. 40).

Portico

The Ionic columns and elements above were found to be original to the structure, including the rusted-out metal roof on top of the porch. A rare survival from ca. 1860, this roofing consisted of tin-coated plates (14" x 20" in dimension) laid with flat seams; it corresponds with the description of the roofing in Henry Austin's original 1859 specifications for the building and is undoubtedly the type of roof once used on the entire house. The roofing was carefully removed and is now stored in the barn.

The roof was judged to be original because (1) it is a type characteristic of the period and (2) the nail holes of the cleats holding it in place were found to be the only nail holes in the roof sheathing boards. Similarly, the sheathing boards were determined to be original since their nails were the only ones found to exist in the rafters.

Around the three outer edges of the porch roof, an original pole gutter once carried rain water to a downspout at the southeast corner. This gutter consisted of a beveled and tapered

board which was covered by the metal roof (Fig. 41).

The features of the original gutter were not duplicated in the restoration because settlement of the entire porch had changed the roof slopes, making it impractical to run water back to the original downspout location. A simple metal diverter was used to keep water off the steps.

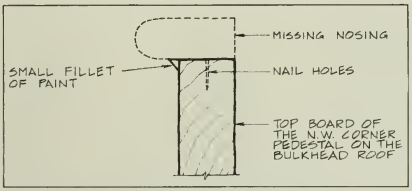
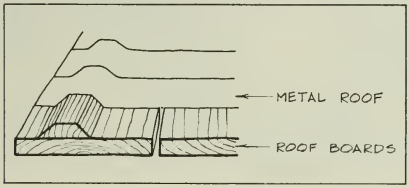


Figure 40 Location of sanded paint build up.

Figure 41 Original pole gutter detail.



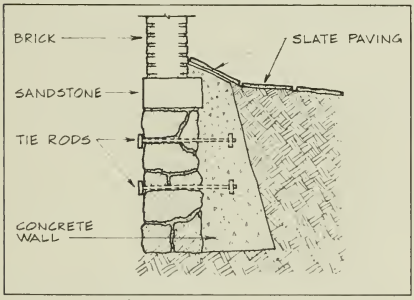


Figure 42 Foundation wall around cellar stair.

Restoration Work

In undertaking the repair of the porch, it was felt that as much original material as possible should be preserved without sacrificing structural strength. Most important of the materials to be saved were the elements which had significance in relationship to the development of the porch. Among these elements were the earlier and later portions of the brick wall and enough mouldings, balusters, column bases and other woodwork to facilitate a future study of both the porch and the later bulkhead. Pieces beyond repair were stored in the barn.

Foundation Wall (Stone)

The stone foundation wall around the cellar stairwell (Fig. 42) had been leaking over a period of time, washing practically all of the mortar into the stairwell; smaller stones had actually begun to fall out. A battered concrete wall was poured below grade on the outside of the old stone wall to provide structural strength and to serve as a water barrier. The old stonework had been carefully cleaned to insure a good key with the concrete.

Threaded rods were passed through the stone wall to support the form work for the new wall and were later left in place as added reinforcement. An asphalt base foundation coating was troweled onto the outside of the new wall. The inside of the stone wall was cleaned and tuckpointed with a mortar consisting, by volume, of:

1 part Portland cement
2 parts hydrated lime
8 parts sand

Foundation Wall (Brick)

The brick wall beneath the Ionic porch had separated internally because no provision had been made to tie the wythes of brick together. Large voids were found. This wall contained considerable physical evidence relating to the development of the porch and prompted our attempt to save it *in situ*.

The voids were thoroughly cleaned and the interior and exterior surfaces tuckpointed. Allowances were made on the exterior surface so that an application of new stucco would obtain a good key in the mortar joints. The wall was then grouted between the wythes through openings at the top and the grout vibrated into all voids.

A grout of Portland cement, fine sand and acrylic emulsion bonding agent (Rohm and Haas *MC76* plus antifoaming agent) was selected from among a number of samples of grout which had been prepared from varying proportions of cement, lime, fly ash and sand (Fig. 43). It was found that a high water/cement ratio was needed to make a sufficiently fluid grout; in consequence, all the mixes containing lime were much too weak and even a plain cement/sand mix was of questionable strength. At this time, we were not familiar with water reducing agents used to make fluid grouts with reasonably low water/cement ratios. Fortunately, we did not experience excessive shrinking of the grout.

A stucco (considered a more stable substitute for the original mastic) was applied to the exterior surface.[4] By volume, it consisted of:

1 part Portland cement
2 parts hydrated lime
8 parts sand

These ingredients were mixed with Standard Dry Wall's *Acryl 60,* an acrylic emulsion bonding agent (acrylic emulsions were used in preference to polyvinyl acetate emulsions because of their greater water resistance).

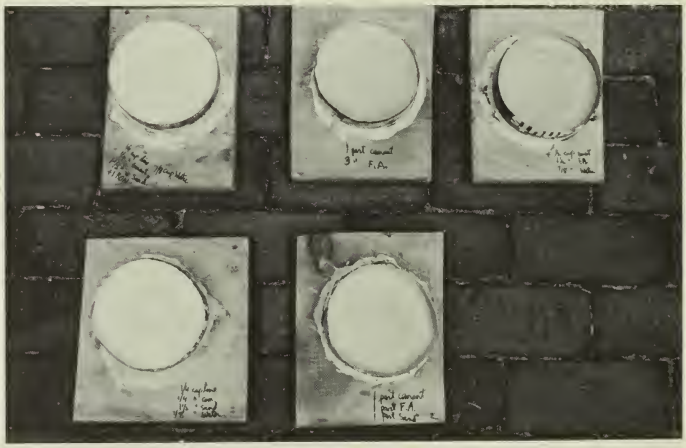


Figure 43
Initial testing of grout formulae for possible use on brick wall.

The earlier cement stucco surface on the northern section of the west wall was retained. Both the new and old areas of stucco were painted with an oil base sanded paint to resemble the original appearance.

Unfortunately, painting instructions were not followed. The stucco should have been allowed to remain unpainted for several months in order for the lime to carbonate. Then, ideally, a primer of acrylic latex would have been applied prior to the coating of sanded paint to prevent peeling caused by any uncarbonated lime reacting chemically with linseed oil in

the sanded paint. Instead, the cure time was only about six weeks; the sanded paint was applied directly onto the stucco.

Porch Floor

The porch floor was replaced with timber framing and tongue and groove flooring. However, this was not considered adequate to prevent a recurrence of the deterioration since water would continue to leak between the boards, soaking the framing. It was decided to treat the floor as a roof because the floor does, in fact, function as a roof over the cellar entry. Lead-coated copper flashing and a built-up asphalt roof were installed over the boards to form the roof surface and redwood duckboards were applied over sleepers on the "roof" to form a walking surface. The sleepers were placed directly on the pine boards and flashed over with lead-coated copper.[5]

The nonhistoric meatlwork was cleaned and coated with sanded paint in order to appear as inconspicuous as possible.

Portico

New pedestals were made for both columns because the north pedestal had deteriorated beyond repair and the south pedestal was a recent replacement with historically inaccurate details. Mouldings from the original pedestals were reused whenever possible. All new woodwork was stamped on the reverse side with indented lettering which read "NEW WOOD 1974," and this lettering remained visible even after the new wood was treated and backprimed.

The original north balustrade was retained in place and the new pedestal fitted to it. The south balustrade's lower rail was kept, as well as all the balusters, while a recent splice to the upper rail was replaced because it had not been an accurate reproduction.

The circular bases for the Ionic columns created a problem in restoration. The base for the south column had been a recent and inaccurate replacement; consequently, a new one was installed which was patterned after the original. The base of the ca. 1860 north column required extensive conservation measures (Fig. 44). The original base was a series of pie-shaped segments glued into a circle and subsequently turned into shape. The glue had deteriorated and the segments were separating; in addition, one edge of the base had been cut off to allow the installation of a metal flashing for the recent bulkhead roof. When this flashing rusted away, the unprotected edge of the base had decayed rapidly. The repairs to the base consisted of re-gluing with waterproof resorcinol formaldehyde glue, adding dowels for strength, and, after the addition of new wood, shaping to complete the base (Fig. 45).

Both columns required patches which were shaped from new wood. Seams had to be reglued and new support blocks were glued inside the columns across the seams.

The addition of new wood was required on the eroded surfaces of the Ionic columns. Where details were lost, new wood was glued onto the capital, then carved (Fig. 46). Penetrating epoxy resins and epoxy wood fillers were used to stabilize the centers of the capitals where decay had begun.

The two roof timbers across the west front and north end of the porch had to be replaced; the timber along the south end was preserved in place and only the piecing-out of the southwest corner was necessary.

The west entablature soffit was replaced as well as segments of the north and south soffits. Architrave and frieze sections were saved through a judicious piecing-out with new wood and generous use of penetrating epoxy resins and epoxy wood fillers. New egg-and-dart mouldings were required at the northwest corner to replace some missing portions.

One new modillion at the northwest corner was required as were several lengths of bed moulding around it. Other work included replacement of the plancier at the north end

[4]The historical reason mastic was preferred to stucco as a backing material for sanded paint may have been to avoid the problem of peeling caused by linseed oil paint being applied to fresh lime stucco. Acrylic latex paint—a good protective barrier between the oil and the lime—was unavailable in 1860.

[5]In retrospect it would have been much better and no more costly to use only lead-coated copper, eliminating the built-up asphalt roof.

and west front; the plancier at the south end was repaired with epoxy resin and fillers.

The original crown moulding around the roof and the fascia boards were similarly saved with pieced-in new wood and epoxy resin fillers. Where the crown moulding had eroded at the corners and the center of the west front, all rotted sections were removed and new wood was glued into place. This new wood was then shaped to match the old material using a metal template to accurately gauge the profile (Fig. 47).

The roof above the porch was replaced with 14" x 20" lead-coated copper sheets to simulate the original tin-coated roof. The early roof had had beveled strips of wood, 3/4" in height,

Figure 44
Base of north column prior to restoration.

Figure 46
Splices to the volute and egg-and-dart moulding.

nailed onto the roof boards to provide a pole gutter which would guide rainwater to a conductor pipe at the southeast corner. Instead, we installed a pitched metal waterstop, 1" in height, above the lead-coated copper as a means of keeping water off the steps. Settlement of the porch had ruled out any attempt to continue the use of the conductor pipe at the southeast corner. Although nail holes in the top of the original crown mould indicated that the original roof (entirely rusted out in this area) had been surface nailed on top of the moulding, the new roof was fitted with a drip edge and secured on a continuous cleat.

The balustrade above the roof was reinstalled with new material where sections were

Figure 45
Pedestals and column bases undergoing restoration.

Figure 47
Restored crown moulding and balustrade of porch roof.

missing (Figs. 48, 49). The remains of the southwest pedestal were inadequate to provide the necessary support, and thus, a new pedestal was installed. The west rails and northwest pedestal were missing and were replaced. Existing balusters were reconditioned and reinstalled and new balusters were turned to replace missing ones (Figs. 50, 51).

Bulkhead Roof

The bulkhead enclosure had suffered from inappropriate repairs and much recent material was removed and replaced. The reuse of earlier materials, even when not original, was prescribed. Using architectural evidence as guidelines, a new nosing around the top of the

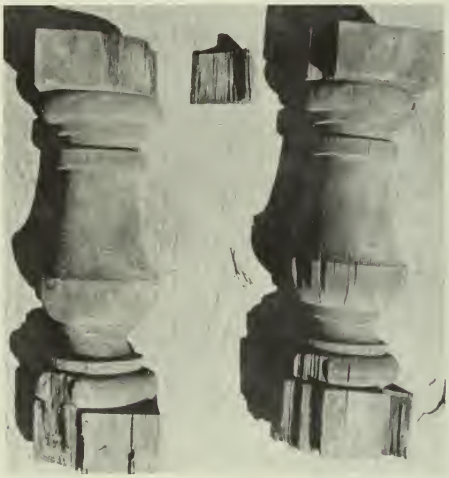


Figure 48
Balusters from porch roof prior to restoration.

Figure 49
Restored baluster from porch roof.

enclosure was constructed and a new flat seam roof of lead-coated copper installed (little evidence remained which would have permitted an accurate reproduction of the original roof). The design of the roof was, therefore, based primarily on functional considerations; for example, much more extensive flashing was used than would have probably existed originally. Historical accuracy was compromised to prevent future leakage, particularly where the roof abutted the sill of the first story window. Although there was no evidence of a sound system of flashing, the new metal roof was counterflashed into the masonry and extended over the wood window sill.

The stone window casing had eroded to the

Figure 50 Detail of restored balustrade of porch roof ready for re-assembly.

Figure 51 Restored balustrade of porch roof ready for re-assembly.

point that the flashing could not be installed until the casing was built up with a cement mortar tinted to match the earlier brownstone. Of several formulas mixed, the one which most closely resembled the brownstone consisted, by volume, of:

Portland cement	1 part
hydrated lime	1 part
purple garnet sand	5 parts
fine brown sand	1 part
orange garnet sand	1 part
burnt umber	2 Tbsps.

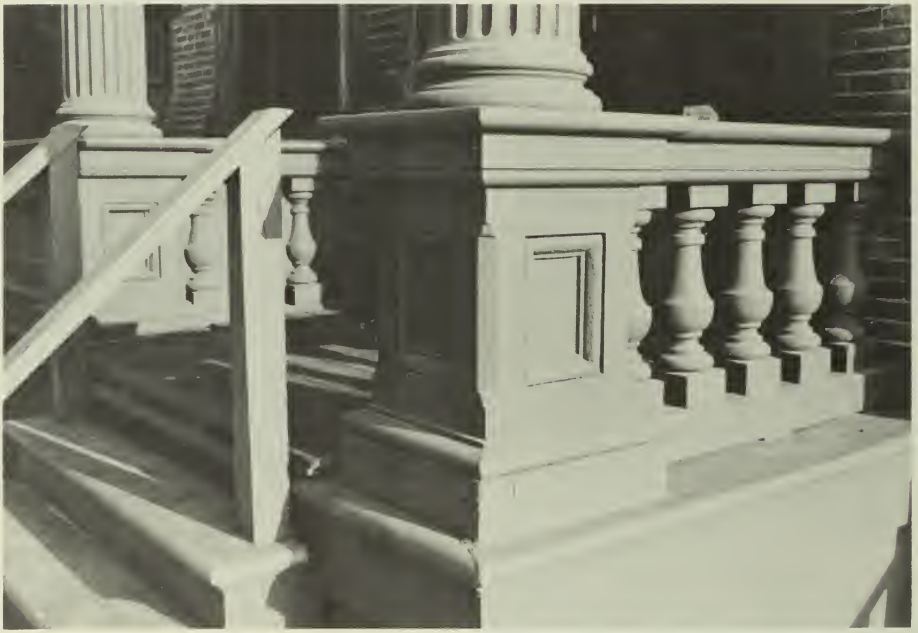


Figure 52 Portion of restored porch with detached stairs.

Porch Stairs

The newly installed stairs up to the porch are not historic in design (Fig. 52); there is, at present, insufficient evidence to justify the expense of a reconstruction. However, the search for photographs and other historic documentation will continue. The simple stairs now in place have been designed to be self-supporting and are not attached to the restored porch (Figs. 53, 54), thereby avoiding potential damage to original fabric.

Figure 53 Restored porch and bulkhead.

Figure 54 Detail of painted north balustrade.

Part III

Planning for Reconstruction of the Ell Porch

November 1976

A nonhistoric unroofed porch occupies the space where the original ell porch stood and will be removed prior to reconstruction.

Reconstruction of the historically accurate ell porch is based on an early stereopticon view and on such specific physical evidence as 1) the south-facing masonry walls against which the porch stood 2) the remaining original porch elements such as the sandstone piers, stair slab and an original section of floor balustrade found in the barn and 3) the similar elevations and details found on the existing small rear entrance porch.

The masonry walls of the main house present clear and identifiable information which establishes the elevation, location and configuration of critical structural and ornamental elements such as beams and rafters, finish floor, flashing, ornamental brackets, floor and roof balustrades, finish ceiling plaster and main entablature. The existing stone piers reveal the original column spacing which also gives the approximate size of the plaster ceiling bays. The surviving slate stair slab gives the width and run of the original porch stairs. The floor balustrade section provides all necessary details for reconstruction of the complete balustrade.

Verification of most of the data found on the masonry walls is provided by the small rear entrance porch.

Almost without exception, the sizes and relationships of the various elements of the two porches are the same. This is true for the entire entablature, both balustrades, the columns and capitals and the ornamental brackets.

With the design and detailing of the original porch firmly established, drawings were prepared by John Hecker and Michael Glynn to provide full size details of all mouldings, framing plans and details for structural members, and elevations and sections to provide the proper relationships and overall organization for the reconstruction (Figs. 55, 56).

Specifications were written calling for materials that would guarantee the longest possible life for all components. All structural framing lumber will be pressure-treated against deterioration due to moisture penetration, fungal growth and insect attack. All fasteners are to be hot-dip galvanized to protect against corrosion. All architectural millwork will be dipped in or painted with a wood preservative to provide greater life and resistance to weathering. The new roof and all flashing and downspouts

will be lead-coated copper. All roofing details have been designed to guarantee that joints will be both watertight and flexible to allow for expansion of the metal. In addition, the sheathing under the roof will be blind-nailed so there will be no possibility of nails puncturing the roof and providing an avenue for moisture.

Drain holes of 1/4" have been drilled through the wooden gutter trough. Spaced every 4' along the length of the gutter, they guard against accumulation of water due to future leaks in the gutter liner. Water dripping from these holes would readily indicate leaks in the gutter liner. Such holes would have been a good feature in the main cornices.

To prevent moisture build-up in the enclosed roof space, small 2" circular screens will be inserted between the cornice modillions. These screens should allow for a minimum of air exchange and will not be readily visible from a distance.

The original brick infill between the stone piers was coated with mastic, then with sanded paint to resemble stone. This brickwork has almost entirely collapsed and will be replaced.

The column capitals and ornamental brackets will be fabricated under separate contract by specially qualified persons, and the restoration of the iron grilles will be similarly accomplished.

Finally, all wood millwork elements and exposed epoxy surfaces will receive a sanded paint finish to match the original in color and texture.

Periodic on-site supervision is required to guarantee compliance with contract documents and to ensure that unforeseen problems will be resolved without compromising the historical, structural or visual integrity of the reconstructed porch.

Figure 55 Example of working drawings for porch reconstruction.

Drawing by John C. Hecker

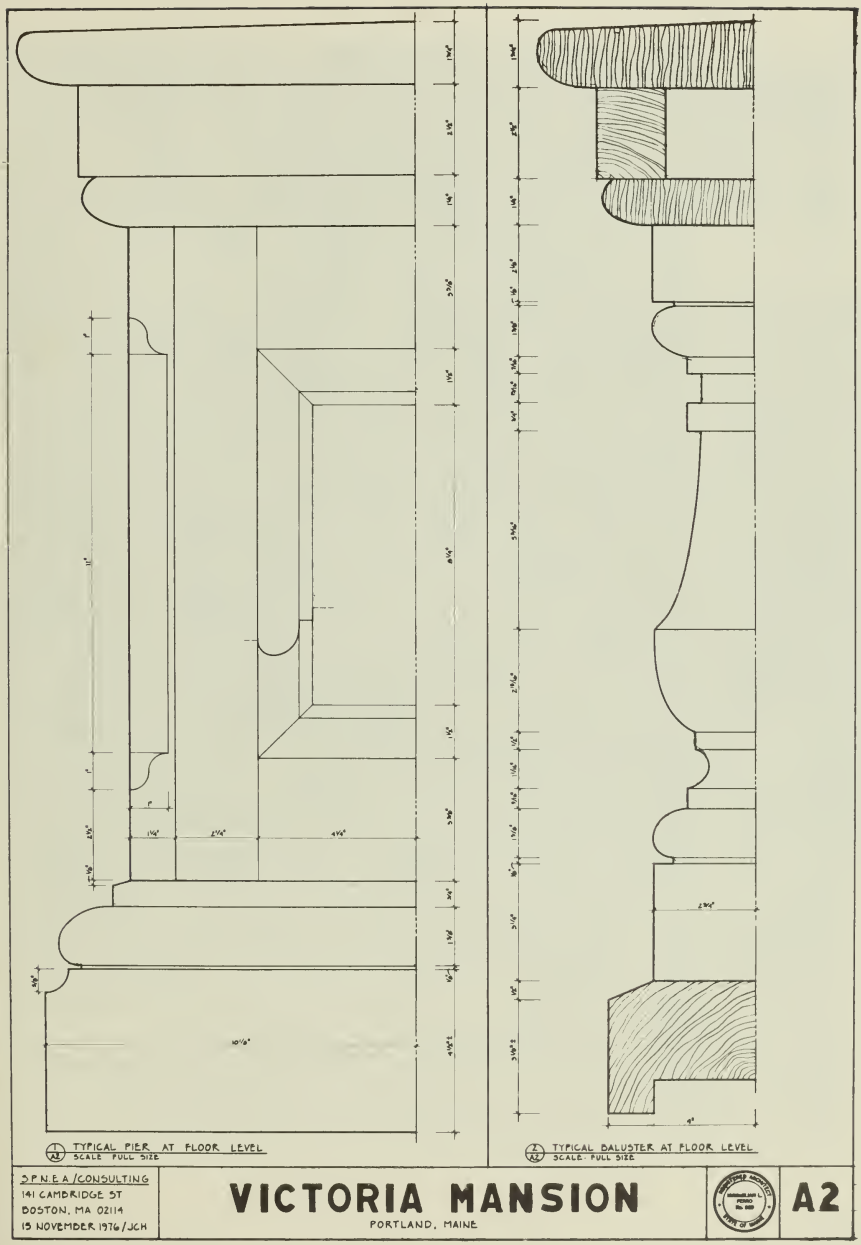


Figure 56 Shop drawing for new pedestals and balusters. *Drawing by John C. Hecker*

Figure 58
This c. 1940 photograph was made sometime after the removal of the porch. Remaining on brick walls is (a) original wood cornice moulding which establishes the plaster ceiling height. The original mastic still appears to be largely intact. Note (b) rafter pockets visible on the long south wall, indicating a shallow-pitched hip roof. *Courtesy of the Society for the Preservation of New England Antiquities*

◁ **Figure 57**
An enlargement made from a stereopticon photograph shows the ell porch at extreme left. This is the only known visual documentation for reconstruction of the original porch. *Courtesy of Earl B. Shettleworth, Jr.*

b
c
d
a
f
e
a
a
c
a

a
c
b

Figure 59
Existing condition of south wall. A comparison with Figure 58 reveals (a) location of beam pockets (now bricked-in) (b) outline of roof balustrade pier (c) location of flashing (d) projection of roof cornice (e) location and size of handrail and (f) location and manner of attachment of ornamental bracket which rests under the entablature soffit.

Figure 60
Close-up of south wall showing (a) outline of roof balustrade pier and (b) remaining lead flashing. Steps in flashing indicate slope of hip roof in this area (c).

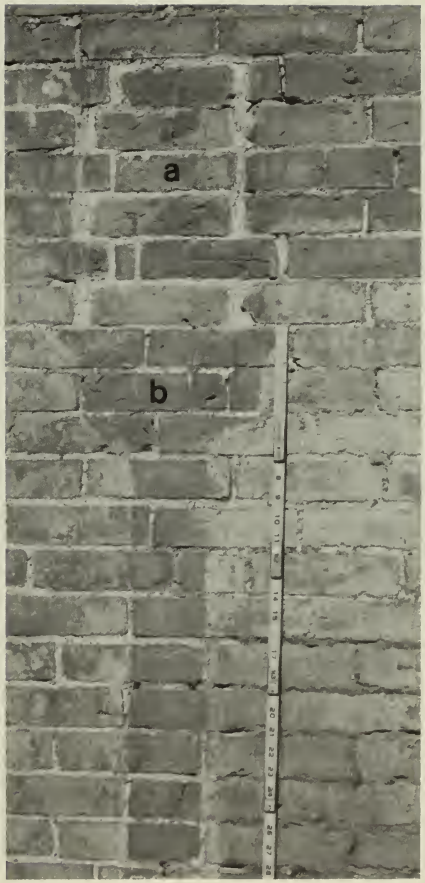


Figure 61
Close-up of south wall showing outline of (a) beam pocket at top and (b) ornamental bracket cap and mounting board below (along ruler). A comparison with Figure 74 shows surviving bracket on the small rear entrance porch.

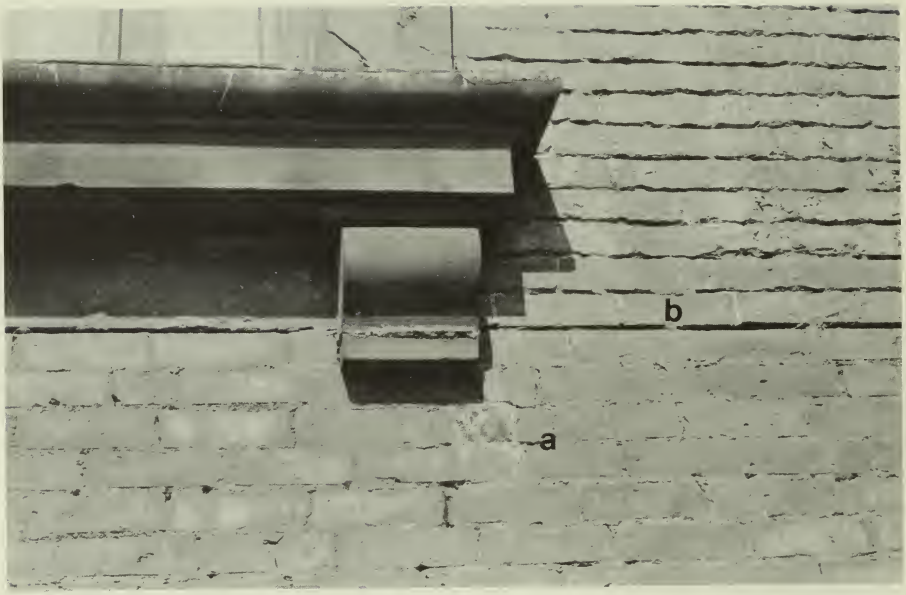
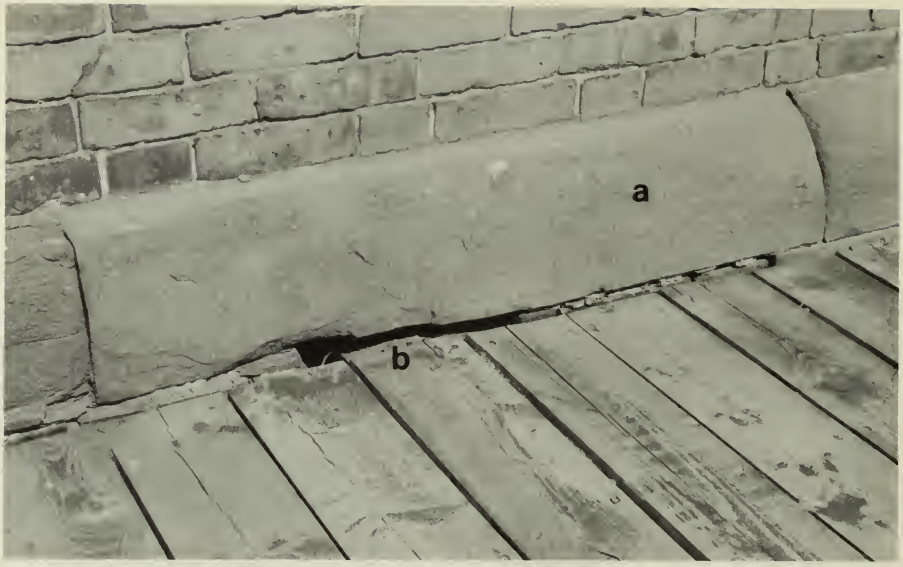
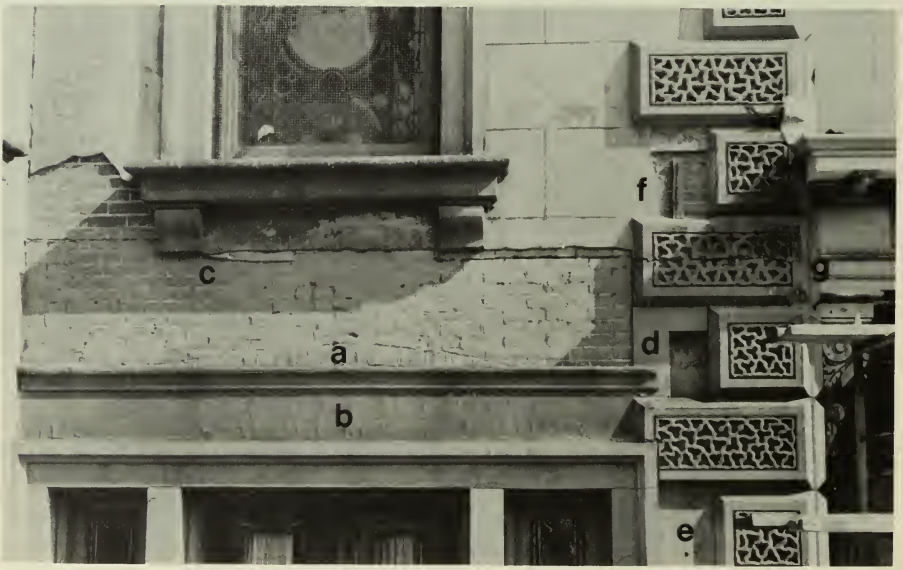


Figure 62
Close-up of south wall showing (a) rafter pocket beneath window console and (b) location of flashing. Apparently the original flashing only abutted the console and was caulked. This detail may have been a source of moisture penetration contributing to the deterioration of the original roof structure.

Figure 63 ▷
Close-up of south wall showing (a) outline of handrail, plus nail and nailer used to anchor the handrail to the masonry wall. The width of this handrail is about half that of the profile of the floor balustrade handrail on the short west wall (see Figure 69). The lack of any nailer at floor level may indicate that this side of the porch only had a handrail and lacked a lower rail and balusters. Another possibility is that the balusters may have been anchored to the floor. Also note that the stone sill above the watertable would have interfered with a lower rail.

a


a
b

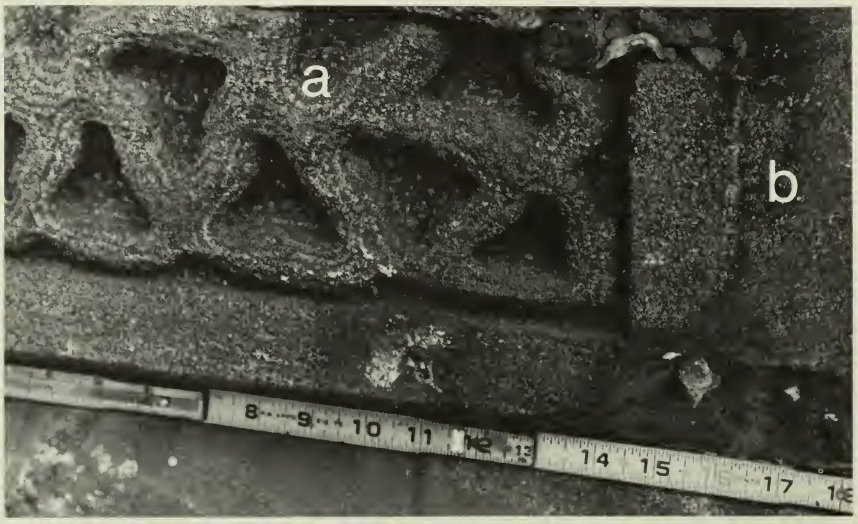

f
c
g
d
a
b
e

◁ **Figure 64**
Close-up of south wall showing (a) sandstone watertable and (b) original beam pocket (to support floor framing) beneath. Other stone sill segments indicate that the original floor elevation was approximately 1" above the bottom edge of the watertable.

◁ **Figure 65**
Existing condition of short west wall showing (a) original wood cornice moulding and (b) mastic beneath still in place. Also evident are (c) stepped lead flashing (d) beam pocket for the porch entablature (e) wood nailer dowels for mounting the block which serves as infill between the quoins (f) a clear outline of the roof balustrade pier and (g) projection of crown moulding located directly below point at which flashing terminates in the quoin. Note the lower height of the porch in comparison with the surviving main house porch to the right.

Figure 66
Close-up of west wall showing the outline of the roof balustrade pier in the surviving mastic. Also note the ghost line of the pier immediately under the 8" mark on the ruler.

Figure 67



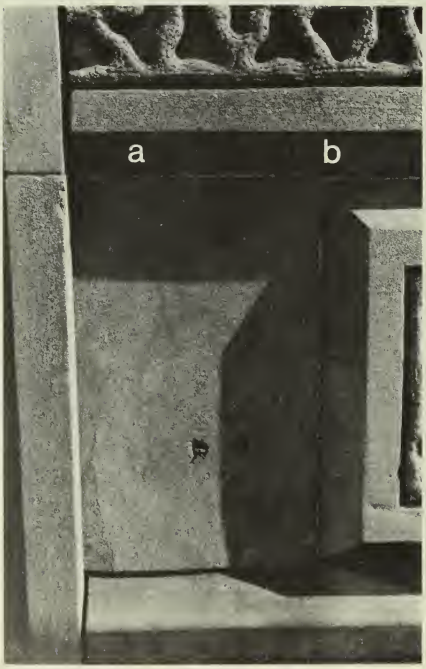


Figure 68

Figure 69

Figure 70

Figure 67
Close-up of west wall at quoins showing (a) surviving lead flashing and reglet and (b) ghost line of the original crown moulding of the cornice.

Figure 68
Close-up of west wall showing the wood nailer dowels used to anchor the infill block and the ornamental bracket. Holes are on the centerline of the major porch elements. Note that (a) vertical ghost lines indicate the width of the infill block. Compare to the existing bracket in Figure 73.

Figure 69
Close-up of west wall showing (a) ghost line of the top moulding of the floor balustrade handrail at the 30" mark on the ruler. Immediately below note (b) two wood nailing dowels used to anchor the handrail to the wall. At sill level note (c) two wood nailing dowels used to anchor the lower rail of the balustrade. Except for the handrail nailers, the other remains are on the centerline of the major porch elements.

Figure 70
Southwest corner showing the restored small rear entrance porch and existing conditions at the south wall. On-site measurements verify that the missing ell porch had elements identical to the small rear entrance porch. By following the brick courses or using the quoins as a guide, it is possible to confirm the identical nature of the evidence.

Figure 71
The only surviving section of the original floor balustrade from the ell porch was found in the barn. Note (a) profiles of the two lowest horizontal elements of the pier, which are peculiar to this porch and vary noticeably from the other two porches. Also note that this section was originally part of a straight run, as indicated by (b) lower rail mounting block and (c) mitering at the top of the pier. This section was part of the original ell porch because both of the other two porches retain their original floor balustrades. It was used to construct all necessary profiles for the new floor balustrade.

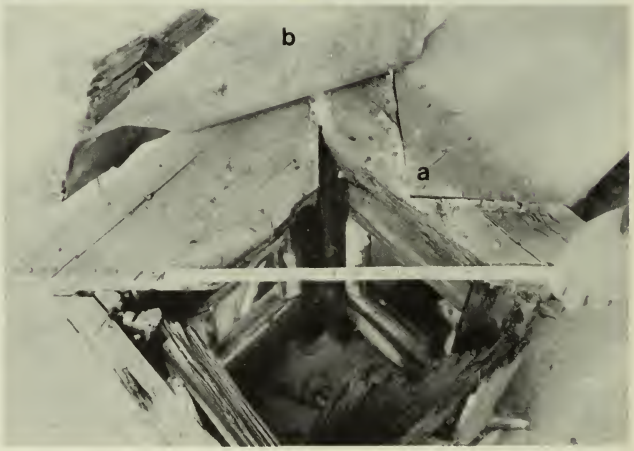


Figure 72
Close-up of original floor balustrade pier showing the faint ghost line left by the original column base. This dimension is identical to that of the column bases on the small rear entrance porch. Note (a) manner of joining the handrail to the pier. Originally, lead was tacked over the joints to prevent moisture penetration. Also note (b) turned-up metal cover at the top of the photograph. This cover probably indicates that the floor balustrade remained in place for some time after the columns and roof were removed.

Figure 73
Detail of main house porch showing one of two methods by which the ornamental brackets were mounted. In this instance, the bracket is mounted on an (a) infill block cut to fit between the quoins. Similar conditions originally existed at the east end of the ell porch (see Figure 68).

Figure 74
Detail of small rear entrance porch showing the second of two methods used to mount ornamental brackets to the wall surface. In this instance, the bracket is mounted on a board the thickness of the mastic. The board is secured to the brick and the mastic passes some distance behind the edges of the carving. Similar conditions originally existed at the west end of the ell porch (see Figure 61).

Figure 75
(top) Existing condition of slate slab at the foot of the nonhistoric ell porch deck. Note darker areas (a) probably caused by the original stair covering this area of the slab. The reconstructed stair will have its first riser at this location.

Figure 76
(bottom) Detail of main house porch showing (a) existing sandstone pier (b) brick infill wall with its original mastic covering and (c) original iron grille in its wooden frame. These conditions will be duplicated in the reconstruction of the ell porch.

Figure 77
Detail of nonhistoric ell porch balustrade. Note that two balusters (a) have a sanded paint finish and have been reused from an unknown earlier location. The reconstructed stairway will have an unobtrusive round steel handrail until further evidence is found to document the original appearance.

Appendix A

Disposition of Small Rear Entrance Porch Elements During Restoration

The following is a list of elements of the small rear entrance porch, as found, indicating their disposition during the current restoration. The elements have been numbered and are keyed to photographs, of which several examples appear as illustrations (Appendix B, Figs. 78-83).

It should be noted that the term "original" refers both to the earliest porch material and the slightly later bulkhead material. All numbered elements removed during the restoration have been stored in the barn.

There are six categories of disposition:

Original A	An original element, restored in place
Original B	An original element, removed and reinstalled
Omit	A recent element, historically inappropriate, removed
Early Repair	A previous repair, historically appropriate, reused
Replace	An original or later element replaced with a new one conforming to the original design
Early Element Removed	Early ceiling boards removed to permit air circulation

RP
1 Original A
2 Original A
3 Original A
4 Original A
5 Original A
6 Original A
7 Original A
8 Original A
9 Original A
10 Original A
11 Original A
12 Original A
13 Original A
14 Original A
15 Original A
16 Original A
17 Original B
18 Replace
19 Replace
20 Replace
21 Replace
22 Omit
23 Omit
24 Replace
25 Replace
26 Original B
27 Replace
28 Replace
29 Replace
30 Replace
31 Replace
32 Replace
33 Original A
34 Original A
35 Original A
36 Original A
37 Original A
38 Original A
39 Original A
40 Original A
41 Original A
42 Original A
43 Original A
44 Original A
45 Replace
46 Replace
47 Replace
48 Replace
49 Replace
50 Replace
51 Replace
52 Early Repair
53 Early Repair
54 Early Repair
55 Early Repair
56 Replace
57 Replace
58 Replace
59 Replace
60 Replace
61 Replace
62 Replace
63 Replace
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123 Original A
124 Original A
125 Original A
126 Original B
127 Original B
128 Original B
129 Original B
130 Original B
131 Original B
132 Original B
133 Replace
134 Replace
135 Early Repair
136 Replace
137 Replace
138 Replace
139 Replace
140 Replace
141 Replace
142 Original B
143 Replace
144 Replace
145 Replace
146 Replace
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148 Replace
149 Replace
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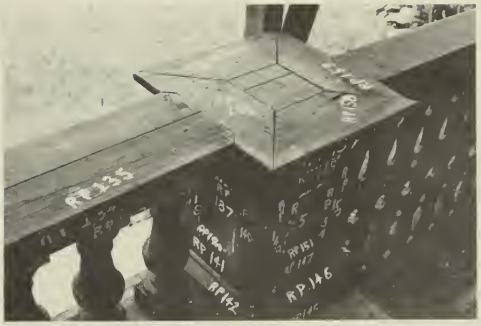
188 Replace
189 Replace
190 Original B
191 Original B
192 Original B
193 Replace
194 Replace
300 Early Element Removed
301 Replace
302 Replace
303 Replace
304 Replace
305 Replace
306 Replace
307 Replace
308 Replace
309 Replace
310 Original A
311 Original A
312 Replace
313 Omit
314 Omit
315 Omit
316 Omit
317 Omit
318 Omit
319 Omit
320 Original A
321 Omit
322 Original A
323 Original A

Appendix B

Examples of Photographic Inventory of Small Rear Entrance Porch Prior to Restoration

RP 137
RP 157
RP 132
RP 139
RP 149
RP 187
RP 140
RP 155
RP 151
RP 147
RP 146
RP 145
RP 144


RP 135
RP 137
RP 141
RP 142
RP 151
RP 147
RP 146

RP 185
RP 177
RP 183
RP 175
RP 132

RP 48
RP 56
RP 50
RP 30
RP 58
RP 62

NPS 190

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all the people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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